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MINISTRY OF THE ENVIRONMENT
AND FOREST RESOURCES

Study on four species of fauna subject to international trade in Togo



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I. Introduction

Togo has acceded to the Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) on 23 October 1978. This convention makes it possible to regulate international trade in species listed in its Annexes, as well as parts and derivatives thereof in order to ensure the conservation of biodiversity.

The implementation of that Convention in Togo has resulted in the adoption of the Decree N° 002/MERF of 25 March 2004 laying down detailed rules implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Thus, the capture, keeping, marketing, import, export and re-export are regulated and subject to the granting of a CITES permit. The issue of those licences is linked to quotas per country on the basis of scientific data on the species concerned. To this end, the Parties to the Convention are invited to cooperate with the CITES Secretariat and the Committees for animals and plants for achieving important trade studies providing regular information on the status of the species in accordance with Resolution Conf. 12.8 (Rev. CoP13). For example, the centre of the global nature of the United Nations Environment Programme (UNEP-WCMC) was commissioned to compile information on the species selected for the review pursuant to the COP15.

To that end, it was recommended to Togo to provide data on three species of which the parrot (*Psittacus erithacus*), the slender chameleon (*Chamaeleo gracilis*), the Home's Hinged-backed tortoise (*Kinixys homeana*) that have been selected for the study of significant trade to CA26. The Emperor scorpion (*Pandinus imperator*) was added to these three species, as it is subject to prohibition of trade from Togo by certain countries including the United States of America.

In the absence of data from Togo on the status of these species, and following the recommendations of the 45th meeting of the Standing Committee of 2001 and the 63th meeting of the Standing Committee in March 2013, by notification 2014/39 of 12 August 2014 on the application of Resolution Conf. 12.8 (Rev.CoP13), exports of *Poicephalus robustus* and *Pandinus imperator* are provisionally suspended for Togo.

The USA, for example, have already suspended the import into their territory of the Emperor scorpion for 2015 and the Scientific Review Group (SRG) of Europe took restrictive measures

to prevent the import into the territory of the European Union of a number of animal species from Togo. Furthermore, the EU in its correspondence Ref. Ares(2015)2880-09/07/2015 of 9 July 2015 demanded from Togo the same information before 31 July 2015.

To meet the requirements of WCMC and with the risk of a suspension of international trade of wild fauna from Togo, the Ministry of the Environment and Forestry Resources financed the present study from its own resources: to provide scientific data on the status of each of the four species concerned. In this report, we present the status of the populations of the species concerned based on bibliographic data supported by field work and surveys of breeding farms and of specimen collection areas. These compiled data should allow the WCMC, the GES of the Commission of the European Union and the United States of America to take decisions on the legality of international trade in wild specimens of these four species from Togo.

II. Objectives of the study

2.1 Overall objective

The general objective of this study is to provide scientific data on the status of populations of four species referred to above and to assist the CITES Management Authority of Togo to take decisions for the sustainable exploitation of live specimens of these species in international trade.

2.2 Specific objectives

It aims to make available scientific information on/for:

- (i) the distribution and size of the populations;
- (ii) the biology of the species concerned;
- (iii) their conservation status and evolution trends;
- (iv) the various threats and pressures on these species, as well as their causes;
- (v) the regulation of trade and wild harvesting, including legal protection;
- (vi) the formulation of recommendations for better trade management of live specimens of the species concerned.

III. Methodology

3.1. Literature data

The literature work was to provide information on the status of the four species by referring to numerous expert work carried out since 1995 by the CITES scientific committee in Togo and the West African sub-region. I will cite the de Buffrénil (1995), Jenkins (1998), Harris (2002), Harwood (2003) and Ineich (2006) reports. The work of Affo (2001) and research work on the herpetological fauna in Togo in recent years were also considered. This involves the work of Segniagbeto (2009), Segniagbeto et al. (2011), Segniagbeto et al. (2014) and Segniagbeto et al. (2015a).

In addition to the work cited, two sources of data on the size of the exploitation of these species were considered. The first is the annual reports of CITES to the Directorate for Forestry Resources (FRD) of the Ministry of the Environment and Forestry Resources; the second is reports of the different aforementioned experts using the data of the UNEP-WCMC. Clearly the values are often no level playing field for both sources. In all cases, the highest value of the two sources was chosen. In addition, all sources of production (table 1) were taken into account. These different "sources" codes have been defined by the resolution of the Conference of the Parties to CITES: Conf. 10.16, COP 13 Doc. 49 and Decision 13.68.

Remember that in most cases the source W is the largest of all production of live specimens used in such trade. In addition, the present definition of the source "R" by the governance bodies of CITES has many shortcomings and the CITES Authority for Togo has often difficulties to assimilate the proper use of this code.

Table 1: Source code to be applied to specimens reproduced in captivity, according to the origin of the offspring

Code	Definition
U	Unknown origin
C	Captive bred animals (particularly species listed in Annex I, reproduced in captivity for non-commercial purposes)
F	Animals born in captivity not complying with the definition “bred in captivity” (F1: later generations)
R	Specimens that come from a ranch breeding facility, without mentioning what constitutes a ranch breeding facility or without referring to any resolution
W	Specimens taken from the wild

Source: Ineich (2006).

Such work and data have given the opportunity to assess the state of play on the status of the different species concerned. A careful study of the conservation status of populations of these species has been made on the basis of the available data. This analysis was made with reference to various documents on the subject. The analysis also took into account the distribution of different species especially compared to the country’s protected areas in order to ensure the presence of a viable population in protected areas.

3.2. Survey of breeding farms

Six approved farm for reptiles breeding in captivity were visited. This is Toganim, Parjar, Mare, Fexas, Adaptation Sarl and Reptiland. These six farms were those exporting more than 90 % of the animals exported in international trade in Togo. In each of these farms, the number of live specimens of the species concerned has been counted.

The CITES authorities of Togo have introduced measures to improve the conditions of detention of marketed animals. Veterinary inspection services responsible for rating each facility based on physical and biological parameters relating to the detention and welfare of the animals have put in place a number of measures. These measures have been assessed during this work. That evaluation was carried out by an inspection of the facilities available on the spot. On the basis of the data collected, the production capacities of the various livestock farms were assessed. An inventory was carried out on the structures available to these wildlife export farms. The zoo-technical knowledge of the livestock producers was also assessed to ensure these farm agents respect the health condition of the produced livestock.

This investigation has also allowed to retain the capture areas concerned by the field work i.e. villages which have been explored to ensure the abundance and frequency of animals in the wild. A list of local “captor or specimen collector” hunters and the corresponding villages has been developed. This list has made it possible to perform the work on the ground. This survey was made on the basis of questionnaires that were sent to the various reptile breeding farms installed in Lomé.

During the surveys of the different farms, information on the population size of the different species available in ranches has also been recorded. The data collected has been recorded in a table for each species. An analysis of the data provided by the farms in comparison with the available literature data and field data enabled to regulate the trade of each species concerned.

3.3. Field work

3.3.1. Selection of areas of data collection

The selection of areas of data collection is based on the information provided by the breeding farms. During surveys of those farms, data on collection areas or ranches was collected. Furthermore, on the basis of available literature data, in particular Segniagbeto et al. (2014 and 2015), on chelonians and lizards of Togo, the distribution areas of the species concerned have also been taken into account in the selection of the different data collection areas. Finally, taking into account the resources available for carrying out this study, a sampling of these zones was carried out not only to avoid a waste of time but also to efficiently use the available resources. On the basis of the criteria thus defined, three areas of data collection have been defined in this work:

The first consists of the area extending from Tsévié to Tabligbo and to Vogan with the surroundings of Lake Togo which presents a good frequency for the Emperor scorpion (*Pandinus imperator*). These are villages as Kpogamé, Gbatopé, Gati, Adangbe, Tchékpo, Ahépé, Kouvé, Dalavé, Assomé, Agbodjékpo, etc. Outside these areas, the species is reported in the regions of the plateaux (Notsé, Dathac, Wahala) and in the central region (Aouda, Fazao, Adjegré).

The second concerns the area from Tabligbo to Notsé taking account of the complex of protected areas of Togodo with localities as Gboto, Vodoupe, Tométy-Kondji, Gboto-Zouvi, Godjinme, Sedome, the village farms of Kouvé, Déve, Asrama, Siyime, Atchankeli, Gbowle, Tetetou, Tohoun, etc. This second area has been defined for *Chamaeleo gracilis*. *Kinixys homeana* has been taken into account in the Déve and Atchankeli area.

The third and last collection area comprises the area of Kpalimé and the area of Badou with a frequency for the other species of which the parrot (*Psittacus erithacus*), the slender chameleon (*Chamaeleo gracilis*) and the Home's Hinged-backed tortoise (*Kinixys homeana*). The main villages concerned by the field work include: Agou, Tavié, Kébo, Dzigné, Kpadapé, Womé, Hanyigba, Kuma Kunda, Kuma Tsamé, Yoh, Tomégbé, Hihéatro, Oga, Badou, Akloa, etc.

3.3.2. Sampling or direct observations of the species concerned

The fieldwork consisted of direct observation and catches with the support of specimen collectors for the different breeding farms in Lomé. The fieldwork took place during the day or at night depending upon the targeted species. To estimate the population size, only the direct counting method was used. This gave information on the demographic parameters of the different species concerned by this study. Sampling methods vary from one species to another and depending on the different sampling sites.

For the slender chameleon: The field work took place at night from 19 p.m. and beyond. During this period of the day, the swarms encourage the activity of the species. Using torches and searching shrubs, they are easy to spot. The animal is easily caught by hand. It can be seized in the neck or at the base of the tail. Sometimes individuals are observed at heights in the trees. In those circumstances, they are simply recorded. The sampling of individuals of slender chameleon was carried out along rural tracks, small tracks in rural areas or along tracks of hunters in protected areas. In the context of work on the slender chameleon, with the exception of localities as Danyi Atigba, Kouma Tokpli and Kamétonou, work in other areas has been achieved with the support of professional captors supplying animals to the different breeding farms in Togo (Bissaga and Amingo). Of course, we also used the services of two other captors in the first localities (Julien from Kouma Konda and Sessi from Yoh (Agome Yoh)). In all cases, support from the captors is crucial for the profitability of the sampling.

For the Home's tortoise: Litters of fallen leaves in forest areas, many dead branches, dead trees etc. have been used. The survey took place during the day and at night. However surveys of farmers have been very useful in the context of field work for the *K. homeana*.

For the parrot: Data collection mostly consisted of direct observations in large trees. These birds often live in colonies in their habitats. They are very timid and, at the drop of a hat, they fly away quickly to flee the danger.

For *Pandinus imperator*: Surface areas of 1 hectare are defined in degraded grassland or abandoned fallow land. At the level of each specific area, five persons are committed to survey the land (Amingo, Bissaga, Komédatchi (student), Magbede (student) and Gabriel Segniagbeto). The idea is to identify the scorpion galleries in a lane of 50 m wide (5 people are at a distance of 10 m each). Thereby, the area of 1Ha is covered on the way out for the first half and on the way back for the other half. During the walk on the surface units, the members of the team move in order to avoid a gallery is counted twice. After having walked the defined surface areas, the whole team counts the number of galleries identified.

3.4. Analysis of field data

For determining the frequency or availability of the species concerned by this study, statistical analyses have been carried out. The various parameters studied are inter alia: the frequency, density, abundance, hunting effort. The frequency was calculated by calculating the mileage index of abundance. The density was calculated by taking the ratio of the number of individuals identified throughout the prospected area estimated in ha. In addition to these parameters, the hunting effort was determined on each of the sites explored.

The different demographic parameters determined can provide information on the population of each species considered in this study. In evaluating the impact of the activities of the breeding farms on wild populations of these species, a comparison was carried out on the total number of individuals counted in farms and populations of these species assessed on the basis of data collected in the field. Obviously, literature data and collection areas considered as ranches were also taken into account. The export quota of the four species concerned by this study has been assessed based on the formula of Harris (2002). New quota proposals have been made.

IV. Results

4.1. Production systems for specimens of breeding farms

4.1.1. Ranching

Breeding systems in Togo mainly operate in theory according to the ranching method, on the one hand to engage the villagers for the conservation of the species and the distribution of the income, but probably also because this production method is much more cost-effective and easier. This production method also keeps the animals captive over much shorter periods and under better conditions. Most often chameleon and tortoises egg are left in the soil where the gravid females put them, while monitor lizard and python eggs are taken from gravid ranch-bred females and placed in natural or artificial incubators (photo 1). The most used technique is to place the gravid females in plastic boxes enabling a greater hygiene and facilitating stock management.



Photo 1: Installation of plastic boxes containing live specimens of animals

In some cases the managers of breeding farms only collect breeding female eggs on the sites of ranching, leaving these females directly at the collection site afterwards. This method seems to be much more productive and avoids the stress of captivity to adult females. Moreover, only eggs are transported from the field to the farms and the hatching rate is far higher. During transport from the field to the breeding farm of gravid females, the many shocks caused significant losses in the eggs contained in their genital tract. This high mortality is now limited. Today only fully shaped and laid eggs are transported carefully to the farms. It is almost certain that the Togolese farms will move towards taking eggs and no longer gravid females in the case of the royal python. The cost of the operation is limited since the adult females are not brought back anymore to the farms where they stayed relatively long; it becomes unnecessary to feed them, and the hatching rate is significantly higher as eggs are much more “healthy”. A drawback may be that the egg heaps are parasitized externally in the interstices by ticks expecting the hatch to bite the young. The treatment of gravid females is easy and eggs are free from pests while it would appear that the treatment of eggs directly is more delicate.

As things stand, there is no robust data on the advantages and disadvantages of these two methods of ranching, i.e. collection of gravid females at the ranching site or taking of eggs. During our field work with the captors, we noted that the collection sites remain the same for each species of wild animals. There is very little diversification of such areas.

4.1.2. Breeding in captivity

The method is more or less under control by the various breeding farms. It concerns mainly turtles of the genus *Kinixys* (*Kinixys belliana noguoeyi*, *Kinixys homeana*, *Kinixys erosa*), of *Pelusios* (*Pelusios castaneus*) and *Pelomedusa* (*Pelomedusa subrufa olivacea*). In some farms there are many individuals with adults and juveniles of *Centrochelys sulcata* in captivity.

The CITES authorities of Togo have put in place effective measures to improve the planning and operating conditions of animals intended for international trade. Let us mention the law N° 2008-09 of 19 June on the Forest Code, Decree N° 002/MERF of 25 March 2004 laying down detailed rules for the application of CITES in Togo.

Within the Directorate for Forestry Resources, a veterinary inspection unit is responsible for

noting each installation according to a scale of points allocated to each physical and biological parameter on the animal holding and welfare. Strict constant monitoring measures have been put in place and are subject to an ongoing evaluation to improve the institutions. Veterinary inspections have enabled to follow carefully all exporters and thus make substantial progress. During the inspection work in the breeding farms, the following parameters shall be taken into account:

Animal nutrition: Some farms are making efforts to feed animals (snakes) with mice they produce themselves. They buy from children hunted wild mice they use as animal feed too. Small lizards (mainly chameleons) are fed from termites or flies. To this end, fruit or decayed meat is placed in the lizard cages. These fruits or decaying meat attract flies which are hunted by the lizards. Tortoises are fed with remnants of vegetables and fruits in addition to what they find in their pens.

Physical parameters: In most farms, the temperature and humidity are often supervised in case of artificial incubation of reptile eggs. Toganim for example uses an egg heating system by water bath (photo 2). As a general rule, the physical parameters necessary to ensure the welfare of kept animals are relatively well monitored and are the subject of a clearly established protocol for each species of reptiles bred in captivity. Within the UNELAT (National Union of farmers and exporters of animals from Togo) there are excellent 'specifications' intended to remedy the shortcomings and the CITES authorities rely on this document to check the parameters of farming. This approach helps improving the conditions for keeping marketed animals.

Shelters: As most of the production of animals in Togo is based on the ranching system, the problem of shelters does not arise. However, cages have been manufactured or plastics have been made available for animals kept longer (sources C especially, or offspring from ranching and kept from one year to the other).

Density: As regards the four species concerned by this study, we have not noticed a high density of animals in pens at the level of the various breeding farms. In the case of scorpions and slender chameleon, animals were single in the plastics. As regards Home's Hinged-backed tortoise, since few farms possess them, the problem of density does not arise. Individuals from other species such as *Kinixys belliana noguoeyi* are often left to wander freely in the courtyard

of certain farms. We have however noted during our work 10 individuals of grey parrots at Mare. But the cage was sufficiently large for this number. In general, the exporters are aware of the problem of density and took measures to avoid stress to the animals.



Photo 2: Incubator of reptile eggs at Toganim

4.1.3. The capture of wild specimens

In Togo, most farms are run through the ranching method. Local suppliers collect the gravid females for the ranching operation method. However they also collect wild specimens (source W) and non-CITES species. These suppliers are numerous and their help is requested each year. Villagers collect the gravid females and deliver them to the exporters. Some of them keep these females (in the case of the royal python, the savannah monitor and the Nile monitor) and breed juveniles that exporters recover regularly, purchasing them. These villagers “producers” have been trained by the exporters who provide them with the necessary equipment. Each gravid female is paid CFA 5000 in the case of *P. regius* and 3000 CFA for *V. exanthematicus* and *V. niloticus*, prices set by all exporters of Togo in the framework of their association (UNELAT). For the royal python, this price is far below that of the nutritional value of the snake (bush meat — around 1500 CFA for a smoked section of 12 to 15 cm), but the Association explained to the villagers that they could draw a regular income from this resource if it was well managed. Sampling areas are numerous and of course

specific to certain species according to their respective habitat. Harris (2002) described the collection methods used in Togo for *Python regius*, *P. sebae*, *Kinixys spp.* and the two species of chameleon.

In the case of systems operating through the ranching method, collectors collect the gravid females which are then distributed among the exporters by the Association (UNELAT) depending on the production of each of them. The animals are looked for in their natural shelter or during their travel periods, including at night.

4.2. Assessment of the status of slender chameleon (*Chamaeleo gracilis*)

4.2.1. Habitat and distribution

The slender chameleon is primarily a savannah species, mainly from the savannah in Guinea. It also exists in the selvedge of forest areas, but does not penetrate riparian forest areas. The species presents a very high distribution at country level. In the rainy season many individuals are found on the main roads of the country where they are usually run over. According to the work of Harris (2002) and Harwood (2003), this species was considered potentially present in all tree or shrub savannah habitats of Togo. However, based on surveys carried out in 1999-2000 per transect to map the populations of *C. gracilis* Togo, Harris (2002) reported that the distribution of the species was “relatively small” and fragmented. Very few observations had been made outside of certain stations well-known by chameleon hunters. In recent years, the work of Segniagbeto (2009) and Segniagbeto et al. (2015a) indicate its relative distribution across ecological zones II, III, IV and V of the country. Surveys of different breeding farms show that catch areas are Notsé, Assrama, Tététou, Tomety-Kondji, Kpele, etc. In the ecological zone I, it is above all in the gallery forests that it is observed. Even if the current work does not provide data on the population size of the species, it is widespread in all the natural ecosystems of the country.

4.2.2. Biology

De Buffrénil (1995) considers the reproduction of this species as being significant in number but not controlled in several establishments of Togo. The biology of this chameleon was studied in Togo (Harris, 2002: 10). Some farms (Fexas and Mare) report having mastered the

reproduction of the species in captivity from gravid females captured in the wild or in the ranching zones. The females lay between 20 and 45 eggs each according to the age and health of the animal. The incubation period is 08 to 10 months. The success rate of hatching is relatively high (more than 70 %). However, this information should be taken with care. No follow-up of the reproduction process has been carried out.



Photo 3: Slender chameleon (*Chamaeleo gracilis*)

4.2.3. Trends and population status

4.2.3.I. Population trend

The collected data in the field show a regular presence of this lizard species in the areas surveyed. In the context of the field work of the study, nine localities have been surveyed. These are localities, Danyi Atigba, Kouma Tokpli, Kamétonou, Kati, Déve (Tovegoe), Atchankeli, Gbowle, Gboto Zouvi, Tomety Kondji. The table shows the number of individuals counted along the transect walks. The distance travelled and the observation effort

have been noted. With the exception of localities as Danyi Atigba, Kouma Tokpli, Kamétonou, the others are considered as ranching zones for this species.

Table 2: Identification of *C. gracilis* in nine localities south of Togo

Locality	Survey date	Observation Effort (hours)	Distance travelled (km)	Number of individuals identified
Danyi Atigba	03/11/2015	3	7	3
Kouma Tokpli	04/11/2015	4	6,5	4
Kouma Tokpli	05/11/2015	4	5	0
Kamétonou	06/11/2015	4	6,5	2
Kati	02/12/2015	3	5	9
Kati	03/12/2015	4	6	7
Déve (Tovegoe)	04/10/2015	4	5	7
Déve (Tovegoe)	05/10/2015	3	8,5	11
Atchankeli	06/10/2015	4	7	10
Gbowle	07/10/2015	3	6,5	5
Gboto Zouvi	08/10/2015	3	6	6
Gboto Zouvi	09/10/2015	4	7	8
Tomety Kondji	10/10/2015	5	7	12
Tomety Kondji	11/10/2015	4	6,5	9
Total		52	89,5	93

The field work in the nine localities identified 93 live specimens of slender chameleon (Table 2). The results indicate that an exploration with professional captors would enable more significant observations for this species. In this, the results achieved in the locality of Kati and those around the Togodo National Park seem to be very important. Within these two zones, the contribution of Amingo and Bissango who are suppliers of different breeding farms in Lomé has been very significant. The kilometric index of abundance of the species is quite high with the support of captors (on average 130 specimens for 100 km travelled) while the surveys that have been carried out without captors are low (36 specimens for 100 km travelled).

What is interesting in the data collected with the captors is that both areas surveyed are traditional hunting sites of these captors (ranching areas). This means that the old collections will have an impact on the wild populations identified. This situation was not observed. The field work showed a regular presence of populations of this lizard species. In this, the mode of ranching operation as defined in collaboration with the local actors (communities of hunters) has no significant negative impacts on the wild populations of this species.

In the areas surveyed, there are field agents (captors) who collect live specimens and sometimes sell them to intermediaries (Rouge, Blaise, Oiseau, Kossivi, Petit Nouglo, etc.) who in turn distribute them to the different farms according to the orders. Sometimes these captors may directly sell live specimens to breeding farms in Lomé. In this, it is difficult to establish a population of the species in the ranching zones supposed to host breeding farms. At farm level, the specimens frequently requested are gravid females laying eggs in installations to recover new-borns for export. It is difficult to collect eggs in the field for this species.

4.2.3.2. State of the population

As regards the state of the populations in general, if we compare data collected in the localities of Kati and the localities around the Togodo national park with the data of Harris (2002), it can be concluded that the population of this species is relatively stable despite regular catches (production through the ranching method) for international trade and the current quota of export (Table 4). The captors with whom we worked in the different localities indicate that the areas we explored should provide more data on the abundance of

the species if the field work took place in the months of April, May and June. During this period, the chameleons are more active for mating and therefore easier to capture. In addition, we have restricted ourselves to work along the tracks in the different zones. There was not necessarily a definition of a sampling area. On the basis of this information and taking into account data on reproduction in captivity of the species (number of eggs laid by female per year), we assume that the population of the species is relatively stable.

In addition to the catch areas defined by the various farms for the exploitation of slender chameleon populations, the species is widespread in the different protected areas of the country, mainly the national parks of Togodo, Fazao Malfakassa and Oti-Kéran and the many reserves such as Abdoulaye, Djamdé, Assoukoko Alédjo, etc. Outside protected areas, it is relatively common in the ecosystems of the ecological zones II, III, IV and V, even if sometimes these ecosystems are degraded by human activities including agriculture. In this, the state of populations of *C. gracilis* in Togo is in general quite stable.

4.2.4. CITES status

C. gracilis is listed in Appendix II of CITES since 04/02/1977. It is one of the most important chameleon species on the global market (Carpenter et al. 2004). It is commonly available on the market for pets in the United States and in Europe, in the form of specimens taken from the wild (Bartlett and Bartlett, 2001; C. Anderson, in lit. at UNEP-WCMC, 2013; Rearick et al., 2013). Anderson (in lit. at UNEP- WCMC, 2013) pointed out that the standard price in the United States was less than US \$20; this species has a high mortality in captivity, due to dehydration or parasitic load (Bartlett and Bartlett 2001; Rearick et al. 2013). According to an assessment of morbidity and mortality in captivity by Altherr and Freyer (2001), *C. gracilis* was considered inappropriate for private breeding because it was “difficult to keep”, “difficult to breed”, had a high mortality in captivity” and required environmental conditions difficult to emulate. Gonwouo (in lit. at UNEP-WCMC, 2013) noted that “given the size of the distribution area, from East Africa to West Africa, and the porous nature of borders between States, it is difficult for the pet trade to assess the country of origin of the specimens of this species when it is not formally documented.”

Togo is the most senior African country involved in chameleon trade (27 years). The US import almost 70 % of chameleons exported globally. The main European importers of this

species from Benin are Germany, Spain and the Netherlands, while from Togo it is mainly France. The size of the individual for export to Europe is of maximum 6 cm. This value is higher for export to the United States.

Table 3: Operation parameters recorded in different farms: *C. gracilis*

Parameters		Toganim	Pajar	Reptiland	Adaptation	Fexas	Mare
Number of animals on the farm at Lomé	W	100	0	—	—	—	100
	R	500	0	—	—	—	
	U	0	0	—	—	—	
Catch area		Tsévié, Tabligbo, Kpalimé, Mono Nangbéto	Tsévié, Atakpamé, Notsé	Tsévié, Agbélouvé, Notsé,	—	Tsévié, Tabligbo	Kpadapé, Tomety Kondji, Atakpamé
Reproduction in captivity		No	No	Yes	—	—	Yes
Laying period		June to September	July to August	June to October	—	—	June to September
Duration Incubation		8 to 10 months	8 to 10 months	8 to 10 months	8 to 10 months	8 to 10 months	8 to 10 months
No. of eggs per gravid female		25-35 eggs	25-35 eggs	25-30 eggs	—	—	25-40 eggs
Size at export	EU	< 8 cm	< 8 cm	< 8 cm	—	—	< 8 cm
	USA.	5-10 cm	Mixed	Mixed	—	—	Unspecified
Export/year	W	500	500	300	—	—	500
	R	100			—	—	
	U	0			—	—	

The investigation work at the different breeding farms is shown in table 3. As regards the number of specimens found in facilities in Lomé, the figures presented are an enumeration of the individuals identified in the inspected trays or plastic. However, in the light of the ranching method of production in Togo, the adult specimens found in farms are probably all from specimens caught in the wild. The supply chain of wild specimens is the same for all farms. The data gathered during the field work justify the decision (SRG 35/4/2/1 2005: 53), stating that the ranching operations must be questioned on the basis of data on the reproduction of the species as presented by Harris (2002). Actually, the breeding farms collect wild gravid females from the captors and have them lay in their facilities. Females are subsequently released within the catch areas described in Table 3. However, the data

provided by the different farms during the assessment of Harris (2002) in the different ranching areas (catch areas) were not the same during this assessment. This implies that in the last decade, they have changed catch areas.

Taking account of the above analysis, it is quite clear that the export size proposed by the CITES Scientific Committee of the European Union (≤ 8 cm) is fully justified. This restriction will lead farmers to be able to produce themselves specimens for the export as it is difficult to meet juveniles in the wild. However, according to the Head of the firm Toganim, the size for export is very limited for this species. He considers that at such sizes, animals are still too fragile to bear the travel conditions. This often leads to a significant loss to the farms. Defining the size for export must be examined by the Scientific Committee of CITES for importing countries. To this end, Toganim proposes authorising the size of 10 cm or more to ensure the survival of the individual during transport. This view is shared by all the farms that we visited during this work. If this should be the case, there should be a mechanism to verify the production of individual farms before the issuance of the export advice by the CITES authority.

4.2.5. Regulation for trade and wild harvesting

In Togo, three legal documents have been prepared for operational management, commercialisation and export of wildlife species. We would mention the following Law No 2008-005 on the framework law on the environment (Articles 61 and 62), the Forestry Code (Articles 78 to 84) and Order 002/MERF of 25 March 2004 laying down detailed rules for the application of CITES in Togo. These legal documents define the management body of wildlife in Togo and establish the hunting, capturing and keeping of specimens of wild fauna. Although to date no list of threatened species, rare or endemic species, species listed in Annex 1, 2 and 3 of CITES has been established, the three legal documents make reference to the lists of species covered by international agreements such as CITES, CMS or the CBD. They also make reference to the red list of IUCN Species.

Efforts are underway to define the taxonomic list as well as the harvesting method of the species concerned by this commercial exploitation. Reforms are planned for the establishment of a scientific basis for defining exploration quotas of the species. For these reforms, there is a need to make the CITES Scientific Authority operational to accompany the CITES

management authority and support the creation of this basis. However, we know the IUCN status and even the CITES status of the species exploited in this trade.

In the case of *Chamaeleo gracilis*, this species has been the subject of a review of its significant trade in 1996 (Significant Trade Review). The Scientific Review Group (SRG) has issued a positive opinion for the import of specimens of that species within the EU from all countries dated 2 September 1997. It has then issued a negative opinion for the import of R source specimens from Togo on 23 June 1999 and W & R sources from Benin on 15 May 2002. R source specimens from Togo were subsequently prohibited of import under Article 4.6(b) of 1 March 2003. A negative opinion for specimens from W source from Togo was made on 20 December 2005. This opinion was confirmed on 20 August 2012, the Commission of the European Union by implementing Regulation No 757/2012 issued a suspension of the export of wild specimens from Togo and Ghana.

In 1999, Togo reptile exporters were purchasing *C. gracilis* from local hunters for 1.2-2 FF (0.2-0.4 \$) and sold them to foreign traders for 40-50 FF (8-10 \$). The average value of the specimens sold online was 37 USD (Harris, 2002). The EU had suspended the trade of *C. gracilis* from Togo in 1999 for R source specimens and in 2005 for wild specimens. Since 2007, the suspension relating to R source *C. gracilis* applies only to specimens with a head-trunk length of more than 8 cm. These two suspensions, pursuant to Commission Regulation (EC) N° 578/2013 of 17 June 2013, remain in force.

According to UNEP/WCMW (2012), no annual reports have been produced by Togo since 2006 on the status of this species. However, Togo was granted export quotas on wild *C. gracilis* every year from 1997 and for R source specimens from 1998 (Table 4). The quota on wild specimens was exceeded in 2002 and 2003 according to the data provided by both importing countries and Togo, and in 2007, according to the data notified by the same country. The quota for specimens of R source seemed to have been exceeded in 2002 according to data provided by importing countries. Togo had not specified whether its annual reports for 2002-2003 and 2007 were established on the basis of the permits delivered or the actual trade. The analysis of the permit numbers released by the importing countries revealed that the noticeable exceeding quotas in 2002 and 2003 could not be explained by the fact that the export permits would have been issued the previous year.

Direct exports of *C. gracilis* from Togo in 2002-2012 were mainly constituted of live specimens traded for commercial purposes, for the majority of R source. Wild *C. gracilis* trade had declined between 2002 and 2010; trade notified by the exporting country had increased in 2011, but no trade in wild specimens had been notified by the importing countries. Trade of R source *C. gracilis* notified by the importing countries had declined between 2002 and 2009, but increased since then. The main importing country of R source as well as wild specimens was the USA. Indirect exports of *C. gracilis* from Togo in 2002-2012 consisted of live specimens traded for commercial purposes, for the majority of R source, with a small proportion of wild specimens.

Table 4: Export quotas of slender chameleon between 2004 and 2013

Years		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Quotas	W	500	500	500	500	500	500	500	500	500	500
Sources	R	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500

4.2.6. Main recommendations for trade of *C. gracilis* from Togo

The information currently available for the status of *C. gracilis* in Togo show a relatively stable population capable of regeneration if the habitat conditions are met. The existing quota (table 4) does not harm the wild populations of the species if we consider the current way of ranching operation of the reptile export farms. In this way, on the basis of the available data and fieldwork, the following recommendations are made to ensure sustainable trade in this species from Togo.

- Maintain the current quota of export of specimens of this species from Togo (namely the two sources 'R' and 'W' as defined in Table 4).
- Revise the export size to a size of ≤ 10 cm from R source to avoid loss of live specimens during transport.
- Make an inventory of populations of the species at the level of the entire national territory in order to assist the management body to establish the annual quotas on a much more efficient basis by taking into account the status of the wild populations. This exercise should propose new catch areas.

- d. Encourage the captors to diversify catch areas: for example define 4 or 5 catch areas according to the years to allow wild populations to regenerate from one year to the next.

4.3. Assessment of the status of the Home's Hinged-backed tortoise: *Kinixys homeana*

4.3.1. Distribution and habitat

Kinixys homeana is mainly a forest species. It is typical of dense semi-deciduous forests. It is also very common in litter along streams in forest areas. Its current distribution area in the forest area is shared between Togo and Ghana. The current localities for collecting live specimens are Badou, Tomegbe, Akloa, Kpélé Elé, Kpadapé, Hanyigban, etc. It is likely to recover this species in the Assoukoko reserve and in the Fazao Malfakassa national park given the presence of isolated areas of forest (Segniagbeto et al. 2015a). Recent work indicates its presence in the Togodo national park, specifically in the Duvé (Tovegoe) area (Segniagbeto et al. 2015b).

4.3.2. Biology

De Buffrénil (1995) considers the reproduction of this species as being significant in number but not controlled in all establishments in Benin and Togo keeping adults. The biology of this species has been studied in Togo in the wild and in ranches (Harris, 2002: 9-10). Egg-laying regularly occurs between May and June of the year with hatching in October/November. The egg-laying of gravid females varies from 3 to 5 eggs. However the work of Luiselli & Diagne (2013) indicates that the species' reproduction in captivity is very difficult. However some farms (Toganim) indicate that the success of the hatching is important; 80 % of the eggs hatch even in captivity.



Photo 4: Home's Hinged-backed tortoise (*Kinixys homeana*)

4.3.3. Trends and population status

The populations of the species are currently highly endangered throughout their distribution areas. The work of Luiselli & Diagne (2013) and Segniagbeto et al. (2014) confirms this worrying trend for the populations of this species. In Togo, it has become very rare to come across live specimens in the natural environment. A few individuals can only be seen in captivity in farms or with local farmers. It is likely that individuals still live in the wild in the forest of Assoukoko, in the two Béna and in the Fazoa Malfakassa national park. Surveys of different breeding farms identified 247 individuals in Lomé.

The current method of ranching operation is not applicable for this species of turtle. In some localities as Yikpa, Akloa, Assokoko, Diguengue, individuals of the species are available with

farmers who carried out of the catches during their farming activities. In Yikpa for example, a collector has 24 specimens of *Kinixys* of which 4 *K. homeana*. Surveys of holders of such specimens indicate that they provide specimens to different breeding farms in Lomé. However, taking account the very specific conditions for the reproduction of *K. homeana*, it is probable that the productions of the localities surveyed could not fulfil the requests, taking into account the current quota. We assume that there are other supply channels of live specimens of this species from Ghana or Nigeria.

In general, the populations of the species in its whole distribution area are seriously threatened (Luiselli et al. 2006, Branch 2007, Chirio and LeBreton 2007). Luiselli et al. (2008) have estimated the size of the population of *K. homeana* and *K. erosa* along 59 transects in humid forest habitats along the coast of West Africa, from Ghana to Nigeria, by means of a distance modelling procedure. The results of this assessment show that in well preserved habitats, the average density is 0.403 to 1.480 per hectare. However, the density varies from 0.15 to 0.9 individuals per ha in collection areas and from 1.65 to 2.85 individuals per ha in areas where these animals are traditionally revered and therefore not hunted (Luiselli 2003a-b). The size of populations of *K. homeana* is severely depressed in areas where these turtles are actively hunted by human populations such as in Togo.

4.3.4. CITES status

The Home's Hinged-backed tortoise (*Kinixys homeana*) is listed in Appendix II of CITES. The evolution of trade in this species from 1985 to 1999 is analysed by Harris (2002). The main European importers of this tortoise from Benin are the Czech Republic, Spain and the United Kingdom and from Togo it is mainly France. The size of the individual must be less than 8 cm for export to Europe and 10 cm for export to the United States.

Table 5: Operation parameters recorded in different farms: *K. homeana*

Parameters		Toganim	Pajar	Reptiland	Adaptation	Fexas	Mare
Number of specimens in the farm at Lomé	W	20	0	0	0	0	0
	R	175	0	0	0	0	50
	U		0	0	0	2	0
Catch area		Badou, Kpalimé	Atakpamé, Kloto	—	—	—	Badou, Kpadapé
Reproduction in captivity		No	No	Yes	—	Yes	Yes
Laying period		December to March	—	December to March	—	October to Nov.	January to March
Duration Incubation		90-110 days	—		—		
No. of eggs per gravid female		4 to 8 eggs / ♀	—	2 eggs / ♀	—	2 to 4 eggs / ♀	3 to 5 eggs / ♀
Size at export	EU	≤ 8 cm	≤ 8 cm	≤ 8 cm	≤ 8 cm	≤ 8 cm	≤ 8 cm
	USA.	≥ 10 cm	≤ 10 cm	≥ 10 cm	≤ 8 cm	≥ 10 cm	≥ 10 cm
Export/year	W	100	0	0	—	100	50
	R	500	700	400	—	200	300
	U	0	0	0	—	200	0

If we consider that the current system of ranching production does not provide sufficient live specimens of this species for international trade according to the data collected from breeding farms (table 5) and the field data, it is appropriate to review the export quota from Togo for R and W sources. This study did not allow carrying out sampling in all localities which may provide live specimens of this species for international trade. In this, it is very important to carry out this sampling and to assess the reproductive capacity following the current system of ranches. During our field work, we believe that these capacities are relatively low compared to the current export quotas (Table 6). For example in 2012, the total number of specimens exported was 770 live specimens against a quota of 2000 “R” specimens (UNEP-WCMC, 2014). If the animals in captivity have enormous difficulties to reproduce, it is obvious that the production in catch areas must not exceed the number of individuals exported per year.

4.3.5. Regulation for the trade and wild harvesting of *K. homeana*

At national level, the three legal documents mentioned above are applicable to the commercial exploitation of specimens of this species. Internationally, *Kinixys homeana* has been the subject of a review of its significant trade in 1993 (Significant Trade Review). The EU SRG gave a positive opinion on 11 November 1997 for the importation, within the European Union, of R source specimens from Togo whose breast length is less than 8 cm. The species is then prohibited of import within the European Union under Article 4.6c dated 1st March 2003 for all live wild specimens. Wild R source specimens from Benin are subject to an import ban in the European Union under Article 4.6b dated 1 March 2003. The SRG subsequently issued a negative opinion on 20 December 2005 for all R and W source specimens from Benin and Togo.

Ghana imports 48 % of exports of this species through Benin. This practice appears to highlight different trade channels in Benin and Ghana or more competitive prices in Ghana, in spite of re-export. *It is however to be noted that Benin appears not to be able to sell its production on its own.* We believe that this information concerning the production of Benin live specimens of this species deserves further investigation. In our view, Benin has very little forest ecosystems and climatic conditions that may allow such production. Specimens of Benin would probably originate from Nigeria.

The United States import 66 % of the production of this species through Togo. Referring to importers' reports, W source specimens were substantially exceeded by Togo since 1997 (+ 674), sometimes more than 1300 individuals. This may be due to a misunderstanding of sources by importers as these specimens from W source could be specimens of R source; if this were the case, it would then be R source specimens which would have been exported in higher quantities than those prescribed by quotas. Table 6 shows the export quota of *K. homeana* from Togo between 2005 and 2013.

On the basis of the state of play of the knowledge generated in the framework of this survey of breeding farms (data collected on the field), the current quota for export of live specimens of this species (Table 6) appears to be harmful to wild populations.

Table 6: Export quotas of Home's Hinged-backed tortoises between 2004 and 2013

Year		2005	2006	2007	2008	2009	2010	2011	2012	2013
Quotas	R	500	500	500	500	500	500	500	500	500
Sources	W	2000	2000	2000	2000	2000	2000	2000	2000	2000

4.3.6. Main recommendations for trade in *K. homeana* from Togo

The analysis of results from the field is that the current quota of export of specimens of this species for all sources should be reviewed downwards in view of its current IUCN (CR) status (IUCN, 2013). An export authorisation would be subject to a state of play of specimens actually available in the ranching system. Given that the export of live specimens of this species from Togo to the European Union was already suspended (correspondence Ref. Ares(2015) 6009995 of 22 December 2015), the following recommendations were made:

- Reduce the current exploitation quota for this species to 400 live specimens per year for the R source and suspend all W sources.
- Draw up a list of adult live specimens currently available in the current ranching system with localities and collectors or captors to help the control of production of individuals for export by the CITES Scientific Authority.
- Monitor and enforce the recommendations of the SRG of the EU CITES Commission compared to the size of the specimens to be exported.
- Carry out a national inventory in order to determine the population size and see whether its trade is possible.

4.4. Assessment of the status of the grey parrot: *Psittacus erithacus*

4.4.1. Distribution and Habitat

The grey parrot (*Psittacus erithacus*) is a large grey bird with a scarlet red tail. It is a species from low elevation humid forests but it can be found at altitudes up to 2 200 m east of its distribution area. It has been observed in palm trees. In West Africa, the species leaves the driest areas of its distribution zone during the dry season. Although its typical habitat is the dense forest, that species of birds is commonly observed on the edge of woodlands in the

clearings, the gallery forests, mangroves, wooded savannahs, cultivated areas and even gardens (Juniper and Parr, 1998). However, the amendment of their habitat often reduces the number of sites available for nests but allows the maintenance of significant populations of large frugivorous birds owing to the increased availability of food in the secondary forest and the anthropogenic habitats.



Photo 5: Grey parrot (*Psittacus erithacus*)

In Togo, the work of Cheke and Walsh (1996) indicate that the species is very rare. Observations were recorded by Millet-Horsin (1923) and Cheke and Walsh (1986) along the coastal lagoons north of the city of Lomé. Since that time no scientific statement mentions the presence of the species in Togo. Current exporters of live specimens of this species in Togo consider that the distribution of the species in Togo is limited to the plateau of Akposso (Badou and its surroundings). This statement should be verified especially as many works on avian fauna in Togo in recent years did not report the presence of the species in the country. During the last quarter of 2013, 8 live specimens were recorded at

Mare. Nevertheless, the Kéran region indicated by Mare is questionable. *P. erithacus* is mainly a forest bird.

4.4.2. Trends and population status

The grey parrot, *Psittacus erithacus*, is one of the most popular pet birds in Europe, the United States of America and the Middle East because of its longevity and its unprecedented ability to imitate the human language and other sounds. This species' distribution area, which covers 3 000 000 km², extends widely in Central and West Africa and marginally in East Africa. There are no data on the total population but it is considered significant. Overall population trends were not assessed but declines have been reported in a large part of its area, in particular in the following countries: Burundi, Cameroon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Nigeria, Uganda, Rwanda, Sao Tome and Principe, Sierra Leone and Togo, and parts of Congo and the Democratic Republic of the Congo. The species is currently listed as "vulnerable" on the IUCN red list (a decrease of more than 30 % over three generations). It is estimated that 15 to 30 % of the population is reproduced, with an average yield of 0.4 nestling by nest. The population density is very variable: estimates in different regions and different habitats vary from 0.15 birds per km² to two breeding pairs by km².

As part of this work, no living specimen has been identified in the wild. Field missions organised with the support of BirdLife International in Togo between October and December 2013 in many areas of ecological zones II, II and IV have not allowed identifying live specimens in the wild. The status of this species' populations in Togo is critical.

4.4.3. CITES status

The catch for trade in wild birds is seen as the largest cause of decline in the population of the grey parrot (*Psittacus erithacus*). The loss of habitat is also an important threat throughout West Africa and East Africa. If there is some domestic demand in the countries within the area of distribution, for example in Nigeria, the effects seem mainly due to international trade, probably because of the great value of this species.

The species is widely traded: from 1994 to 2003, the export of slightly less than 360.000 specimens caught in the wild in states of the distribution area has been reported, the vast majority (98 %) coming from Cameroon, Democratic Republic of Congo, Congo and Côte d'Ivoire. Besides registered trade, there is a significant illegal trade, including undeclared trade between the states of the distribution area. Trade in this species concerns only live specimens.

The species *Psittacus erithacus* was examined in the context of the review of significant trade established by Resolution Conf. 8.9 of CITES, the recommendations of the study have been communicated to the parties concerned in mid-1992 (see below). Exports from Cameroon, Côte d'Ivoire and the Democratic Republic of Congo have been subject to CITES notifications in response to an earlier review and/or concerns aroused more generally by the control of trade. They were also the subject of recommendations to the importing country to suspend imports of this species until problems (particularly irregularities in the permit or failure to respect quotas) have not been resolved.

An analysis based on the levels of trade (legal and presumed illegal) and the population levels indicate that *P. erithacus* is a species which must be urgently addressed as to its trade from Ivory Coast, Guinea, Liberia and Sierra Leone, and the situation could be worrying in Cameroon, Congo, Equatorial Guinea, Democratic Republic of Congo and Togo. In addition, the current reports on illegal and/or poorly documented trade, and the substantial increase in the trade in birds reported as bred in captivity require further attention.

Table 7: Exploitation parameters recorded in different farms: *P. erithacus*

Parameters		Toganim	Pajar	Reptiland	Adaptation	Fexas	Mare
Number of specimens in the farm at Lomé	W	—	10	—	6	0	10
	R	—	0	—	0	0	0
	U	—	0	—	0	0	0
Catch area		—	—	—	—		
Reproduction in captivity		—	—	—	—	—	—
Laying period		—	—	—	—	—	—
Duration Incubation		—	—	—	—	—	—
No. of eggs per gravid female		—	—	—	—	—	—
Size at export	EU	—	—	—	—	—	—
	USA	—	—	—	—	—	—
Export/year	W	—	—	—	—	—	—
	R	—	—	—	—	—	—
	U	—	—	—	—	—	—

The analysis of the data provided by the farms (Table 7) show that the very presence of the species in Togo is questionable. All breeding farms agree to recognise that the specimens exported from Togo are of Nigerian or Cameroon origin. Orders are generally placed for groups of 20 to 25 specimens. Hunting is made by trapping in the settlements of these birds. The traps take the shape of sticky objects which catches the animals once they land on the trees.

A hazard on the status of this species is that most of the current orders are from Asian origin (Lebanese Pakistani, Indian and Chinese). The applicants do not hesitate to go directly to Nigeria and Cameroon to acquire the number of specimens they need. To this end, some farm managers want an export quota to be put in place in Togo in order to regularise the trade in this species. Others want a framework for collaboration between the CITES authorities of Togo and Nigeria to regulate the commercial exploitation of this species.

4.4.4. Regulation for trade and wild harvesting

The CITES Secretariat through the Animals Committee made recommendations for the first time at the CITES Management Authority of Togo in June 1992 on the status of the species in Togo. According to these recommendations, the Management Authority should establish a moratorium on exports until it has proved that the headcounts of the species are available in the country and that their exploitation is sustainable (primary recommendation), and should carry out a population study (secondary recommendation) (Document AC Doc. 8.10).

In October 1992, the Management Authority replied that, based on a study that was undertaken during that year, there was no viable population in the country, and therefore no further export permit would be issued (SC.29.11). Trade continued to a limited extent. However, 14 birds were reported as exported for commercial purposes between 1994 and 2004 (5 in 2004), the others being exported primarily as personal specimens. There are many of them on the internal market (Cheke and Walsh, 1996) and there is some domestic demand for the red feathers of their tail for medicinal purposes. The CITES management authority of Togo notes that between 1995 and 2005, the species has only been used as pet bird at the national level. The species is regarded as less of a concern as regards permitted exports from Togo.

Table 8 presents data collected during this study on current exports of live specimens from Togo. According to the CITES Authority of Togo, there is currently no clearly established exploration quota due to the fact that most specimens come from neighbouring countries, mainly Nigeria. Accordingly, it would be useful that the CITES Management Authority of Togo in collaboration with the breeding farms in an inclusive framework issue an opinion for a provisional suspension of the export of individuals of the species from Togo.

Table 8: Declared export of live specimens of grey parrots between 2004 and 2013

Year		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Specimens exported	R	0	0	0	0	0	0	0	0	0	0
	W	11	4	0	20	13	13	10	2	5	1

4.4.5. Main recommendations for the trade in *P. erithacus* from Togo

On the basis of the information collected from individual breeding farms as well as data relating to the current status of wild populations of this bird species in Togo, the following recommendations were made:

- a. Live specimens of R and W source may be authorised to be exported only in the case of re-exportation. In those circumstances, the source of the specimens must be established with the agreement of the CITES management authorities of the country of origin.
- b. Carry out a study on the conservation status of this bird species at the national level and if necessary in the event of discovery of a population, establish a monitoring protocol for the conservation of this population.

4.5. Assessment of the status of the Emperor scorpion: *Pandinus imperator*

4.5.1. Distribution and habitat

Pandinus imperator according to the work of Ineich (2006) is the only type of scorpion of the sub-region (Benin, Togo, Ghana) ‘produced’ in captive breeding structures (Benin), ranches (Togo) or from W source wild specimens (Ghana). It is the largest scorpion in the world, up to 20 cm. The scorpion is listed in Annex II of CITES since 16 February 1995 and Annex B of the European Regulation since 1 June 1997. In Togo, this species is exploited in ranching in an area defined for five consecutive years by the different breeding farms (Ineich, 2006). *The quota of 16 500 for Togo, however, appears to be well adapted to the potential production and the international demand.*



Photo 6: Emperor scorpion *Pandinus imperator*

4.5.2. Biology of the species

This social species (rare occurrence within this zoological group) can easily be collected locally, which makes it particularly vulnerable; usually at least 2 to 3 individuals are collected together under the same shelter. The shelters are made of gallery, piles of dead grass, old termite mounds, decaying tree trunks, etc. Moreover, it is a species with a breeding strategy of R type, which does not allow the heavily exploited populations to recover, except in the case of a correctly practiced ranching.

4.5.3. Trend and population status

Within the six farms involved in this study, many individuals of the species are divided into various plastic boxes. The managers of these farms mention that the species' reproduction in captivity is easy. The captors indicate that all females were collected when they were gravid. The scorpion is a social arthropod whose brood is small (20-30; some exporters say between 20 and 40). The gestation period is lengthy (7 to 9 months or longer if the individual is stressed) and juveniles are highly dependent on their parents (several months or years in

nature). Ranching births take place all year round, with however a peak which appears to emerge around February to April. Specimens born in captivity reach a size enabling their commercialisation between 8 to 10 months. The adult size is reached around 3 years and life can further continue for 1 to 3 years. Most are sold at adulthood and they have thus in the best case, only half of their lifetime left. Many amateurs say that the species easily reproduces in captivity if its needs in heat and moisture are insured. There are farmers, mainly in the United States and Europe, specialised in captive breeding of this species.

In Togo, the area of collection of live specimens is essentially centred on the maritime area (Prefectures of Vo, Yoto, Notsé and Bas-Mono). The animals collected are kept with much more care into plastic boxes. Following the recommendations of Ineich (2006), exporters have nearly all developed a system of small plastic boxes designed to contain only a single gravid individual and/or its progeny. However, in most cases, it is the local captors who supply the majority of specimens that are exploited commercially.

The field work in assessing the population of the species has been made in five localities (Gati, Adangbe, Agbodjekpo, Tchekpo and Kouvé). The results of this work indicate a relatively high abundance of the species. Table 9 below shows the relative abundance of individuals of the species in the different sites explored. The estimate of the number of individuals per hectare is calculated on the basis of the following principle. In some galleries, it is possible to count two or three individuals. There are sometimes females which carry from 25 to 30 juveniles. In those circumstances, we consider only the female as individual. If we consider that in each prospected site, between a quarter and half of the galleries count two individuals, the estimated values of the number of individuals per hectare are shown in Table 9. However, it should be noted that these values are likely be low compared to the reality. The number of individuals per hectare in those areas of collection would certainly be more significant than the values mentioned in the Table 9.

Table 9: Count of the number of galleries of *Pandinus Imperator* in five municipalities in the south of Togo

Localities	Date	Sites	Number of galleries counted per hectare	Estimate of number of individuals per hectare
Gati	20/02/2016	Location 1	136	170 to 204
Adangbe	20/02/2016	Location 1	145	181 to 217
Adangbe	20/02/2016	Location 2	108	135 to 162
Tchekpo	21/02/2016	Location 1	122	152 to 183
Agbodjekpo	21/02/2016	Location 1	142	177 to 213
Ahépé	21/02/2016	Location 1	98	122 to 147

The analysis of the data in Table 9 shows a relatively high abundance of this scorpion species in the south of Togo. Within the five surveyed localities, the habitats are made of fallow land abandoned by local farmers. In these fallow lands one can mainly find palm oil trees and abandoned manioc fields. In general, the data from this field work shows a strong presence of this scorpion species throughout the maritime region and the plateaus of the country. The species is also present throughout the territory.

4.5.4. CITES status

From 1989 to 1994, this species was only modestly present on the markets and exports fluctuated between around 3800 and 9535 specimens. From 1996 on, the figures for exports leapt dramatically, from 4719 in 1994 to 44927 in 1995 and 56346 in 1996, mainly because of Ghana and Togo (CITES scientific authority of the Netherlands, CC 98/728 of 16 November 1998). The exporting countries are Benin, Ghana, Togo and Tanzania (by mistake of identification, as it is not a country of the distribution area). After an informal analysing by the Scientific Review Group (SRG) of the European Union in 1998 after some doubts were expressed, the latter gave a positive opinion for an import of 50 specimens from Ghana.

This species has not been subject to any prior study to our knowledge and available data is limited. Ghana has not set a quota for this species. The main European importers from Togo are Germany, Spain and France. As regards EU imports from Ghana they mainly concern the Czech Republic, Denmark, Germany and Spain.

Table 10: Operation parameters recorded in different farms: *P. imperator*

Parameters		Toganim	Pajar	Reptiland	Adaptation	Fexass-Herp Togo	Mare
Number of individuals at the farm in Lomé	W	100	0	0	2	0	0
	R	580	10	0	0	0	500
	U	0	0	0	0	0	0
Specimen collection areas		Tsévié, Tabligbo Mono Nangbeto	Amlamé Tsévié Vogan	Tsévié Agbélouvé Notsé Kara	Tsévié Notsé	Tsévié Notsé	Tsévié
Reproduction in captivity		No	Yes	Yes	No	No	Yes
Breeding period		—	April to November	—	not specific	—	January November
Duration of incubation		8 to 14 months	8 to 14 months	8 to 14 months	8 to 14 months	8 to 14 months	8 to 14 months
Number of young per female		20 to 25 scorplings	25 to 40 scorplings	20 to 25 scorplings	15 to 35 scorplings	10 to 25 scorplings	20 to 40 scorplings
Size at export	EU	5 to 8 cm	≤ 10 cm	≤ 8 cm	—	≤ 5 cm	≤ 8 cm
	US	5 to 10 cm	≥ 10 cm	Mixed	—	—	Adults
Export/ year	W	500	0	0	—	0	0
	R	5 000	1 200	1 500	—	2 000	5 000
	U	0	0	0	—	0	0

The analysis of the data provided by the different farms (Table 10) is consistent with the results of the field work (Table 9) as to a significant presence of the species in the southern part of the country. Outside the areas cited as ranching zone, the species is quite frequent in the southern part of the country. Many specimens have recently been found in the central region of the country (Segniagbeto. per. com) in particular in localities as Aouda, Adjegré, Fazao. The current level of sampling of breeding farms is not endangering the different populations of the species that can be found in the country.

4.5.5. Regulation for trade and wild harvesting, including legal protection

To date, to our knowledge, there are no real rules established for the international trade of *Pandinus imperator*. The legal texts for the collection, possession and marketing of

wildlife in Togo apply also to this species. Table 11 shows the export quota of specimens of this species between 2005 and 2013. However, according to data from the importing countries, the quota of W source specimens has been exceeded for several years: 1997 (+ 17349), 1998 (+ 14627), 1999 (+ 16910), 2000 (+ 11270), 2001 (+ 30210), 2002 (+ 34510), 2003 (+ 22476). These differences may result from confusion between the R source of Togo for exports and the W source noted for imports, but in any case the numbers are well above the quotas; this situation should not continue after the 2006 season according to the work of Ineich (2006).

Table 11: Emperor scorpions export quotas between 2005 and 2013

Year		2005	2006	2007	2008	2009	2010	2011	2012	2013
Quota	W	1000	1000	1000	1000	1000	1000	1000	1000	1000
/source	R	13500	13500	13500	13500	16500	16500	16500	16500	16500

4.5.6. Main recommendations for the trade of *Pandinus imperator* from Togo

At the current state of knowledge, the different populations of the species are not affected by the current level of exploitation of live specimens in international trade. However, it would be advisable that the current system of ranching operation be strictly followed and respected by the various breeding farms. In this context it is advisable to have a definition of collection areas from year to year in order to safeguard wild populations from one zone to another. On the basis of the results of the field, the following recommendations were made:

- a. Re-open the trade in *Pandinus imperator* from Togo to the countries of the European Union. The current collection quota of R source specimens at 16 500 specimens per year and W source at 1000 specimens based on the functioning mode in ranches of this species of scorpion does not affect wild populations. Likewise, an increase in the quota of R source to 20 000 specimens per year is not harmful to wild populations either.
- b. Define with the captors variable annual collection areas so as to ensure the renewal of wild populations from one locality to another and from one period to another. The current collection areas are fallow lands which can be exploited from one year to the next by the landowners for agriculture.

4.6. Different threats and pressure exerted on these species and their causes

4.6.1. Loss of habitats

With the exception of *Pandinus imperator*, the main threats to *Kinixys homeana*, *C. gracilis* and *Psittacus erithacus* in Togo boil down to the degradation of their habitats. Throughout their distribution areas, there has been a significant loss of habitats of these species. According to the FAO report (2010) on the assessment of the status of forest ecosystems, the rate of loss of natural habitats in Togo rose from 4.50 in 2005 to 5.57 in 2010. This destruction has not spared protected areas; the Missahohe forest for example, one of the forest habitats of these species, has been completely destroyed within 5 years. This loss of habitats is a threat to the survival of the populations of these species.

Very little is known of the actual impacts on the loss of habitats on populations of such species and their capacity to adapt to the changes imposed by this loss of habitats. It is clear that populations are increasingly exposed to various threats such as hunting (human catches), predation and the effects of climate change.

4.6.2. Climate change phenomena

In Togo as well as in West Africa, the climate is not stable. Regional climate projections show a high level of trust in the rise of temperatures in the region, but there is little consensus about the trend and magnitude of potential changes in precipitations, with a high variability in the projections (Belle et al. 2016). It is expected that these changes will have significant impacts on ecosystem services such as carbon storage. The work of Belle et al. (2016) has clearly recognised that biodiversity is affected by climate change and that a significant number of West African species (including amphibians, birds, freshwater fish, mammals and reptiles) were identified as vulnerable or adapt to climate change on the basis of their specific biological features.

Generally, it is agreed that these phenomena will affect the distribution of species in the light of the extension of vegetated areas which will be under the effects of climatic parameters (temperature and precipitations). However in a recent review led by Guelly & Segniagbeto (2013) on behalf of the IUCN in Togo, the following effects have been

identified: insufficiency, irregularity, delay, or early stop of the rainfall in the forest areas of Togo. In Diguengue for example (semi-deciduous forest area), one reported during 2013, early rainfall (already in February) that has not helped the agricultural practices, as this situation has not allowed slash-and-burn agriculture, a normal practice in the region. These changes in climatic parameters will certainly affect the behaviour of forest species. The impacts of such events, together with those of habitat destruction are likely to threaten the survival of forest species' populations.

V. Discussions

5.1. System of production of live specimens

In Togo, most farms are run according to the method of ranching. With this method, collectors collect gravid females which are then distributed among exporters by the association (UNELAT) depending on the production of each of them. The animals are looked for in their natural shelter or during their move periods, including at night. During their time on the breeding farms, the animals are kept captive for much shorter periods and under better conditions. This system of production allows, in one way or another, a redistribution of revenues between exploitation farms and rural communities that are often pickers or collectors of live specimens. This activity became for some of them a genuine profession which starts by breeding wildlife specimens. In some cases the managers of breeding farms only collect eggs from incubating females on the ranching sites, simply leaving these females at the collection site afterwards. This method seems to be much more productive and avoids the stress of captivity to adult females. A drawback may be that the egg heaps are parasitized externally in the interstices by ticks expecting the hatch to bite the young. The treatment of gravid females is easy and eggs are free from pests while it would appear that the treatment of eggs directly is more delicate.

As things stand, there is no robust data on the advantages and disadvantages of these two methods of ranching, i.e. collection of gravid females at the ranching site or taking of their eggs. During our field work with the captors, we noted that the collection areas remain the same for each species of wild animals. There is very little diversification of such areas. In the light of the foregoing, there is a need to deepen the knowledge about the advantages and disadvantages of those methods of ranching and consequences related

to the exploitation of animals in the same areas. Also, it would be interesting to encourage farms to diversify the ranching zones to allow wild populations to recover and to avoid the development of parasites on specimens exploited in international trade.

5.2. Status of populations of the assessed species

The status of populations of the four species assessed for international trade differs from one species to another. Of the four species concerned by this study, the status of populations of two species seems critical: the Home tortoise (*Kinixys homeana*) and the grey parrot (*Psittacus erithacus*). For these two species, international trade in live specimens should be temporarily suspended for W sources of these species. The quota for the R source of *Kinixys homeana* will have to be reduced to 400 individuals per year.

On the basis of current data available, grey parrots will only be subject to re-export from Togo. It would appear that wild populations of the species no longer exist in Togo. In this case, the exporter must prove the origin of the specimens and the CITES authorities of the country of origin must issue an export licence accompanying the application for re-export.

For the other two species (*Chamaeleo gracilis* and *Pandinus imperator*), the largest quantity of exported specimens are R source. The present system of ranching production is not prejudicial to wild populations. All sources including the W source may be authorised for these two species. In this sense, the current quota of *Chamaeleo gracilis* can be maintained. In the case of the scorpion, the current quota may even be revised upwards (20 000 live specimens/year). There are very abundant populations of this species in southern Togo and the species case is quite frequent throughout the country.

5.3. Production capacity of breeding farms

Of the six farms involved in this study, only four have a well organised production capacity of captive animals and ranching system. These are Toganim, Pajar, Mare and Adaptation Sarl. The managers of FEXAS (experimental farm for wild animals) are currently making efforts to raise their production standards to the level of the others. However, Reptiland must make further efforts to improve their facilities. In general

terms, efforts are being made by producers to put the animals in good conditions both at production and at export level. In order to support a real assessment of the production capacity of each farm, exporters must, in agreement with the CITES authorities, identify at least two periods of the year during which the CITES authorities may engage in a rigorous counting without negatively affecting the productivity of the establishments (couplings, wintering, etc.). Only this procedure will allow appreciating the production capacity of those farms.

5.4. Source codes of specimens produced in breeding structures

In 2006, Ineich indicated that the source codes of captive-bred animals are relatively obscure for the exporters of Togo. Accordingly he recommends that codes be translated into clearly comprehensible terms and adapted to their specific context. The distinction between C and R sources is generally not clearly understood. The use of source codes F1 and F2 should be avoided as it would lead to even more significant misunderstandings as a serious marking of specimens is impossible at present.

In all cases it will be impossible to assign a verifiable source code to produced specimens if an establishment does not limit itself to a single type of production by species (C or R) unless a permanent marking system was made available, which is not yet the case. *In all cases, the CITES authorities will have to carry out very rigorous checks on entries and outputs in each establishment, indispensable condition for the importing countries' credibility of the source of the produced specimens.* Many establishments in Togo use different systems of production according to species and demand (young or adults), such a procedure can absolutely not be monitored by the CITES authorities.

5.5. Establishment of quotas

For the four species, the quotas established by Togo have been relatively constant since their inception. Currently, the quotas are fixed in consultation with the exporters (breeding farms). They do not take any scientific basis into account, nor the following parameters: the product of half the population of each exporter (assuming that the sex-ratio is balanced, which is rarely the case) or of the precise quantity of females if known, multiplied by the average number of juveniles produced for the species concerned.

For each species in the future, quotas should be set taking into account not only the number of females but also the **proportion of females actually reproducing** because each female does not reproduce every year; this is now clearly established for many species such as the royal python. This parameter can be easily obtained by exporters if they are told how to proceed and if a regular follow-up is put in place.

5.6. Reliability of the information provided by exporters

Many experts (Ineich 2006; de Buffrénil 1995; Harris 2002) have already raised doubts about the information provided by breeding farms. It would be better for all actors that reliable information be produced by those primarily concerned. *The reliability of the information provided by farms is a key element to ensure the sustainability of the trade in wild animals in Togo.* Ineich (2006) stated that keeping registers does not allow efficient use during inspections. It is up to the CITES authority to put in place a mechanism for much stricter control of the production of the different breeding farms.

5.7. Institutional and technical capacity-building of the officials of the Ministry of the environment and forestry resources

Institutionally, the Ministry of the environment and forestry resources does not have a proper operational CITES Scientific Authority. The current issues in the management of international trade of wild fauna and flora claim that countries such as Togo with a long-standing tradition of export of wild animals should establish such structure and make it operational. Similarly the current CITES management body is not better structured. There is a need for a genuine CITES management authority with powers that could lead the process of developing CITES certificates for the export of wild animals on the basis of scientific data and not of data provided by the breeding farms.

Technically, the officials of the Directorate for Forestry Resources of the Ministry of the environment and forestry resources have very little power for a better management of the criteria of significant trade in wildlife species in Togo. It is very important to define a series of thematic clusters linked to the taxonomic status of the species, to the source codes of specimens, to the audit and evaluation of the production capacity of the breeding farms. To this end, the Ministry of the environment may seek the support of any technical

partner in the development and implementation of a programme of capacity-building for officials through training workshops.

5.8. Capacity-building of the managers of breeding farms

Managers of breeding farms have a very limited knowledge of the current issues in the conservation of animals and in general terms of biodiversity. They are sometimes surprised by the suspension notices issued by the CITES Secretariat or the CITES Scientific Committee of the European Union. In those circumstances, there is a need to inform the actors of the export of wild fauna on the current issues in the conservation of biodiversity. Togo committed to preserve biological resources through international conventions or treaties. It must comply with commitments under these treaties or conventions.

5.9. Regional cooperation

Data on the origins of the specimens of grey parrots (*Psittacus erithacus*) indicate that they mainly come from Nigeria and Cameroon. Similarly most of the specimens of the Home's Hinged-backed tortoise (*Kinixys homeana*) come currently from Ghana and Nigeria. In this, there is a need to develop regional cooperation or regional programmes for CITES management of specimens of wild fauna. The creation of such a programme should facilitate CITES management at the level of the ministries concerned. A participation of scientific, technical and financial partners for the development and implementation would be very useful. At the current state of knowledge, the countries covered by CITES management at sub-regional level have very little power to drive such a process.

VI. Conclusion

Through this study, an evaluation of the populations of four species of the Togolese fauna subject to international trade has been carried out on the basis of literature data, surveys at the different breeding farms and field data. The results of the study showed clearly based on the current system breeding farms operating mode ranching, availability of populations of two species: *Chamaeleo gracilis* and *Pandinus imperator*. For these two

species work has recommended the maintenance of the current quota: for the slender chameleon (500 specimens for the W source and 2500 for the R source) and for *Pandinus imperator* (1000 specimens for the W source and 16 500 for the R source). For the latter species, an increased quota of R sources to 20 000 live specimens is not detrimental. As regards the results for the other two species relevant to this study, we proposed a reduction of the quota of R sources of *Kinixys homeana* to 400 individuals per year, and a full suspension for W sources of *K. homeana* and all sources of grey parrots,.

With reference to the suspension notice issued by the Scientific Review Group (SRG) of the European Union (ref. Ares(2015) 6009995 of 22 December 2015), the CITES management authorities of Togo, should, on the basis of the results and main recommendations of this study, make a request for the reopening of trade with EU countries for the species concerned. In this, the CITES authorities of Togo must take the necessary measures with the actors for a close monitoring of the origin of the specimens of the species concerned and for source codes to be clearly established. In general, the work has shown a willingness of the actors (managers of the breeding farms) to improve the production system of live specimens of the species used in international trade.

However, further efforts are required to ensure the sustainability of the commercial exploitation of populations of the species of wild fauna in Togo. In discussions about this study, we have made recommendations which should be taken into account both by the CITES management authorities and the managers of the different breeding farms to ensure this sustainability. In those circumstances, and given the insufficient resources available to the Ministry of the environment, Togo may seek support from partners such as the EU to strengthen the capacities of actors involved in the commercial exploitation of wild animals to ensure this sustainability.

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